

Fourth and Eighth Grade Mathematics and Science Achievement From TIMSS 2003

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Presentation Outline

Introduction to TIMSS

Mathematics

- 2003 performance
- Change between 1995-2003
- Performance differences

Science

- 2003 performance
- Change between 1995-2003
- Performance differences

What is TIMSS?

- Administered to fourth- and eighth-grade students in mathematics and science in the United States and 45 other countries.
- Linked to the mathematics and science curricula of the participating countries.
- Designed to track changes in achievement over time.

Who Participated?

Grade 4:

25 countries participated
in 2003

15 countries participated
in 1995 and 2003

In the United States, 9,829 students
from 248 schools participated

Participating Countries in Fourth-Grade TIMSS 2003

Armenia	Lithuania
Australia •	Moldova, Republic of
Belgium-Flemish	Morocco
Chinese Taipei	Netherlands •
Cyprus •	New Zealand •
England •	Norway •
Hong Kong SAR •	Philippines
Hungary •	Russian Federation
Iran, Islamic Republic of •	Scotland •
Italy	Singapore •
Japan •	Slovenia •
Latvia •	Tunisia
	United States •

• Country also participated in 1995

Who Participated?

Grade 8:

45 countries participated in 2003

35 countries participated in 2003 and either 1995 or 1999, or both

In the United States, 8,912 students from 232 schools participated

Participating Countries in Eighth-Grade TIMSS 2003

Armenia	Lithuania •
Australia •	Macedonia, Republic of •
Bahrain	Malaysia •
Belgium-Flemish •	Moldova, Republic of •
Botswana	Morocco
Bulgaria •	Netherlands •
Chile •	New Zealand •
Chinese Taipei •	Norway •
Cyprus •	Palestinian National Authority
Egypt	Philippines •
Estonia	Romania •
Ghana	Russian Federation •
Hong Kong SAR •	Saudi Arabia
Hungary •	Scotland •
Indonesia •	Serbia
Iran, Islamic Republic of •	Singapore •
Israel •	Slovak Republic •
Italy •	Slovenia •
Japan •	South Africa •
Jordan •	Sweden •
Korea, Republic of •	Tunisia •
Latvia •	United States •
Lebanon	

Student Performance in MATHEMATICS

Grades Four and Eight

Fourth Grade Mathematics Performance

- In 2003, U.S. fourth-graders scored 518 on average in mathematics, exceeding the international average of 495.
- In 1995, U.S. fourth-graders also averaged 518 in mathematics.
- Although there was no measurable difference in the average scores of U.S. fourth-graders between 1995 and 2003, their mathematics performance relative to their peers was lower.

**Average mathematics scale
scores of fourth-grade
students, by country: 2003**

Country	Average score
International average	495
Singapore	594
Hong Kong SAR ^{1,2}	575
Japan	565
Chinese Taipei	564
Belgium-Flemish	551
Netherlands ²	540
Latvia	536
Lithuania	534
Russian Federation	532
England ²	531
Hungary	529
United States²	518
Cyprus	510
Moldova, Republic of	504
Italy	503
Australia ²	499
New Zealand	493
Scotland ²	490
Slovenia	479
Armenia	456
Norway	451
Iran, Islamic Republic of	389
Philippines	358
Morocco	347
Tunisia	339

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

¹Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

²Met international guidelines for participation rates in 2003 only after replacement schools were included.
NOTE: Countries are ordered by 2003 average score. The test for significance between the United States and the international average was adjusted to account for the U.S. contribution to the international average. Countries were required to sample students in the upper of the two grades that contained the largest number of nine-year-olds. In the United States and most countries, this corresponds to grade 4. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2003.

Differences in average mathematics scale scores of fourth-grade students, by country: 1995 and 2003

Country	1995	2003	Difference ¹
Singapore	590	594	4
Hong Kong SAR ^{2,3}	557	575	18 ▲
Japan	567	565	-3
(Netherlands) ³	549	540	-9 ▼
(Latvia-LSS) ⁴	499	533	34 ▲
England ⁵	484	531	47 ▲
(Hungary)	521	529	7
United States³	518	518	#
Cyprus	475	510	35 ▲
(Australia) ⁵	495	499	4
New Zealand ⁵	469	496	26 ▲
Scotland ³	493	490	-3
(Slovenia)	462	479	17 ▲
Norway	476	451	-25 ▼
Iran, Islamic Republic of	387	389	2

#Rounds to zero.

▲p<.05, denotes a significant increase.

▼p<.05, denotes a significant decrease.

¹Difference calculated by subtracting 1995 from 2003 estimate using unrounded numbers.

²Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

³Met international guidelines for participation rates in 2003 only after replacement schools were included.

⁴Designated LSS because only Latvian-speaking schools were included in 1995. For this analysis, only Latvian-speaking schools are included in the 2003 average.

⁵In 1995, Maori-speaking students did not participate. Estimates in this table are computed for students taught in English only, which represents between 98-99 percent of the student population in both years.

NOTE: Countries are ordered based on the 2003 average scores. Parentheses indicate countries that did not meet international sampling or other guidelines in 1995. All countries met international sampling and other guidelines in 2003, except as noted. See NCES (1997) for details regarding the 1995 data. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one country may be significant while a large difference for another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the largest number of nine-year-olds. In the United States and most countries, this corresponds to grade 4. See table A1 in appendix A for details. Detail may not sum to totals because of rounding. SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Average mathematics scale scores of fourth-grade students, by country: 1995 and 2003

Country	1995	Country	2003
Singapore	590	Singapore	594
Japan	567	Hong Kong SAR ^{1,2}	575
Hong Kong SAR ^{1,2}	557	Japan	565
(Netherlands)	549	Netherlands ¹	540
(Hungary)	521	Latvia-LSS ³	533
United States	518	England ¹	531
(Latvia-LSS) ³	499	Hungary	529
(Australia)	495	United States¹	518
Scotland	493	Cyprus	510
England	484	Australia ¹	499
Norway	476	New Zealand ⁴	496
Cyprus	475	Scotland ¹	490
New Zealand ⁴	469	Slovenia	479
(Slovenia)	462	Norway	451
Iran, Islamic Republic of	387	Iran, Islamic Republic of	389

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

¹Met international guidelines for participation rates in 2003 only after replacement schools were included.

²Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

³Designated LSS because only Latvian-speaking schools were included in 1995. For this analysis, only Latvian-speaking schools are included in the 2003 average.

⁴In 1995, Maori-speaking students did not participate. Estimates in this table are computed for students taught in English only, which represents between 98-99 percent of the student population in both years.

NOTE: Countries are ordered based on the average score. Parentheses indicate countries that did not meet international sampling or other guidelines in 1995. All countries met international sampling and other guidelines in 2003, except as noted. See NCES (1997) for details regarding 1995 data. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the most number of nine-year-olds. In the United States and most countries, this corresponds to grade 4. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Eighth-Grade Mathematics Performance

- U.S. eighth-graders scored 504 on average in mathematics, exceeding the international average of 466.
- U.S. eighth-graders showed significant improvement in average mathematics performance between 1995 and 2003.
- The relative performance of U.S. eighth-grade students was higher in 2003 than in 1995.

**Average mathematics scale
scores of eighth-grade
students, by country: 2003**

Country	Average score
International average	466
Singapore	605
Korea, Republic of	589
Hong Kong SAR ^{1,2}	586
Chinese Taipei	585
Japan	570
Belgium-Flemish	537
Netherlands ¹	536
Estonia	531
Hungary	529
Malaysia	508
Latvia	508
Russian Federation	508
Slovak Republic	508
Australia	505
(United States)	504
Lithuania ³	502
Sweden	499
Scotland ¹	498
(Israel)	496
New Zealand	494
Slovenia	493
Italy	484
Armenia	478
Serbia	477
Bulgaria	476
Romania	475
Norway	461
Moldova, Republic of	460
Cyprus	459
(Macedonia, Republic of)	435
Lebanon	433
Jordan	424
Iran, Islamic Republic of	411
Indonesia ³	411
Tunisia	410
Egypt	406
Bahrain	401
Palestinian National Authority	390
Chile	387
(Morocco)	387
Philippines	378
Botswana	366
Saudi Arabia	332
Ghana	276
South Africa	264

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

¹Met international guidelines for participation rates in 2003 only after replacement schools were included.

²Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

³National desired population does not cover all of the international desired population.

NOTE: Countries are ordered by 2003 average score. The test for significance between the United States and the international average was adjusted to account for the U.S. contribution to the international average. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Parentheses indicate countries that did not meet international sampling or other guidelines in 2003. Countries were required to sample students in the upper of the two grades that contained the largest number of 13-year-olds. In the United States and most countries, this corresponds to grade 8. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2003.

Differences in average mathematics scale scores of eighth-grade students, by country: 1995, 1999, and 2003

Country	1995	1999	2003	Difference ¹	
				(2003-1995)	(2003-1999)
Singapore	609	604	605	-3	1
Korea, Republic of	581	587	589	8 ▲	2
Hong Kong SAR ^{2,3}	569	582	586	17 ▲	4
Chinese Taipei	—	585	585	†	#
Japan	581	579	570	-11 ▼	-9 ▼
Belgium-Flemish	550	558	537	-13 ▼	-21 ▼
(Netherlands) ²	529	540	536	7	-4
Hungary	527	532	529	3	-2
Malaysia	—	519	508	†	-11
Russian Federation	524	526	508	-16 ▼	-18 ▼
Slovak Republic	534	534	508	-26 ▼	-26 ▼
(Latvia-LSS) ⁴	488	505	505	17 ▲	#
(Australia) ⁵	509	—	505	-4	†
(United States)	492	502	504	12 ▲	3
Lithuania ⁶	472	482	502	30 ▲	20 ▲
Sweden	540	—	499	-41 ▼	†
(Scotland) ²	493	—	498	4	†
(Israel) ⁷	—	466	496	†	29 ▲
New Zealand	501	491	494	-7	3
(Slovenia) ⁵	494	—	493	-2	†
Italy ⁷	—	479	484	†	4
(Bulgaria)	527	511	476	-51 ▼	-34 ▼
(Romania)	474	472	475	2	3
Norway	498	—	461	-37 ▼	†
Moldova, Republic of	—	469	460	†	-9
Cyprus	468	476	459	-8 ▼	-17 ▼
(Macedonia, Republic of)	—	447	435	†	-12 ▼
Jordan	—	428	424	†	-3
Iran, Islamic Republic of	418	422	411	-7	-11 ▼
Indonesia ⁶	—	403	411	†	8
Tunisia	—	448	410	†	-38 ▼
Chile	—	392	387	†	-6
Philippines	—	345	378	†	33 ▲
South Africa ⁸	—	275	264	†	-11

—Not available.

†Not applicable.

#Rounds to zero.

▲p<.05, denotes a significant increase.

▼p<.05, denotes a significant decrease.

¹Difference calculated by subtracting 1995 or 1999 from 2003 estimate using unrounded numbers.

²Met international guidelines for participation rates in 2003 only after replacement schools were included.

³Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

⁴Designated LSS because only Latvian-speaking schools were included in 1995 and 1999. For this analysis, only Latvian-speaking schools are included in the 2003 average.

⁵Because of national-level changes in the starting age/date for school, 1999 data for Australia and Slovenia cannot be compared to 2003.

⁶National desired population does not cover all of the international desired population in all years for Lithuania, and in 2003 for Indonesia.

⁷Because of changes in the population tested, 1995 data for Israel and Italy are not shown.

⁸Because within classroom sampling was not accounted for, 1995 data are not shown for South Africa.

NOTE: Countries are sorted by 2003 average scores. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one country may be significant while a large difference for another country may not be significant. Parentheses indicate countries that did not meet international sampling or other guidelines in 1995, 1999, or 2003. See appendix A for details regarding 2003 data. See Gonzales et al. (2000) for details regarding 1995 and 1999 data. Countries were required to sample students in the upper of the two grades that contained the most number of 13-year-olds. In the United States and most countries this corresponds to grade 8. See table A1 in appendix A for details. Detail may not sum to totals because of rounding. SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995, 1999, and 2003.

Average mathematics scale scores of eighth-grade students, by country: 1995 and 2003

Country	1995	Country	2003
Singapore	609	Singapore	605
Japan	581	Korea, Republic of	589
Korea, Republic of	581	Hong Kong SAR ^{1,2}	586
Hong Kong SAR ¹	569	Japan	570
Belgium-Flemish	550	Belgium-Flemish	537
Sweden	540	Netherlands ²	536
Slovak Republic	534	Hungary	529
(Netherlands)	529	Russian Federation	508
Hungary	527	Slovak Republic	508
(Bulgaria)	527	Latvia-LSS ³	505
Russian Federation	524	Australia	505
(Australia)	509	(United States)	504
New Zealand	501	Lithuania ⁴	502
Norway	498	Sweden	499
(Slovenia)	494	Scotland ²	498
(Scotland)	493	New Zealand	494
United States	492	Slovenia	493
(Latvia-LSS) ³	488	Bulgaria	476
(Romania)	474	Romania	475
Lithuania ⁴	472	Norway	461
Cyprus	468	Cyprus	459
Iran, Islamic Republic of	418	Iran, Islamic Republic of	411

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⁴National desired population does not cover all of the international desired population.

NOTE: Countries are ordered by average score. Parentheses indicate countries that did not meet international sampling or other guidelines in 1995 or 2003. See appendix A for details regarding 2003 data. See NCES (1997) for details regarding 1995 data. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the largest number of 13-year-olds. In the United States and most countries, this corresponds to grade 8. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

U.S. Subpopulation Performance in Mathematics

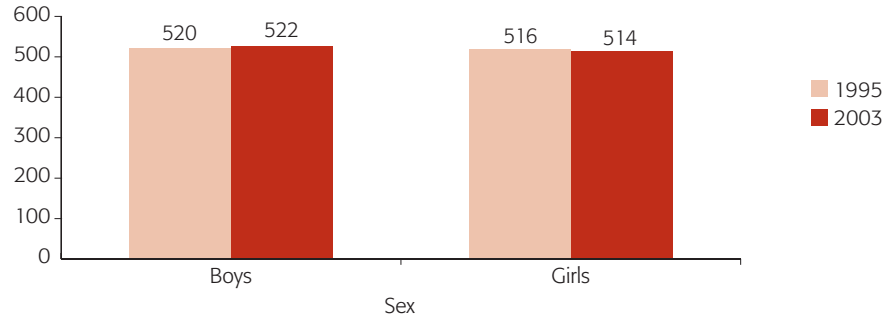
Grades Four and Eight

Fourth Grade Subpopulation Mathematics Performance

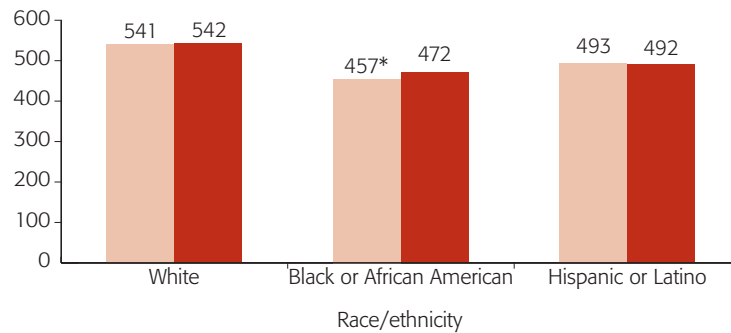
- Black U.S. fourth-graders showed improvement in average mathematics performance between 1995 and 2003.
- The gap in average mathematics scores between White and Black fourth-grade students narrowed.
- No measurable change in average mathematics performance for most subpopulations of U.S. fourth-graders.

Average mathematics scale scores of U.S. fourth-grade students, by sex, race/ethnicity, and poverty level: 1995 and 2003

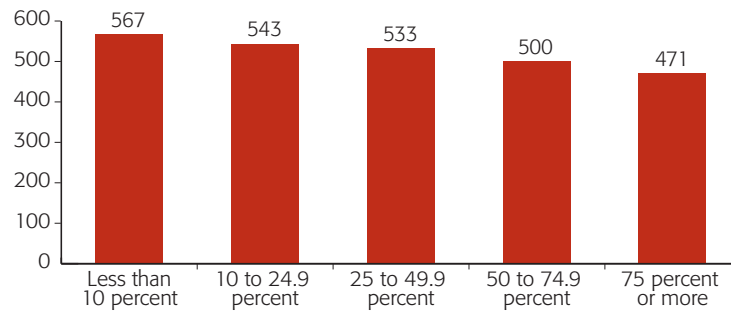
Average score



Average score



Average score



Percentage of fourth-grade students eligible in school for free or reduced-price lunch

* $p < .05$, denotes a significant difference from 2003 average score.

NOTE: Reporting standards not met for Asian category in 1995 and American Indian/Alaska Native and Native Hawaiian/Other Pacific Islander for both years. Racial categories exclude Hispanic origin. Other races/ethnicities are included in U.S. totals shown throughout the report. Analyses by poverty level are limited to students in public schools only. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one student group may be significant while a large difference for another student group may not be significant. The United States met international guidelines for participation rates in 2003 only after replacement schools were included. See appendix A for more information.

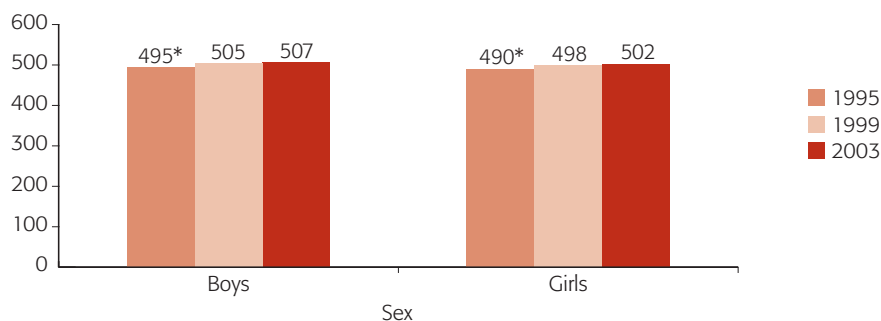
SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Eighth Grade Subpopulation Mathematics Performance

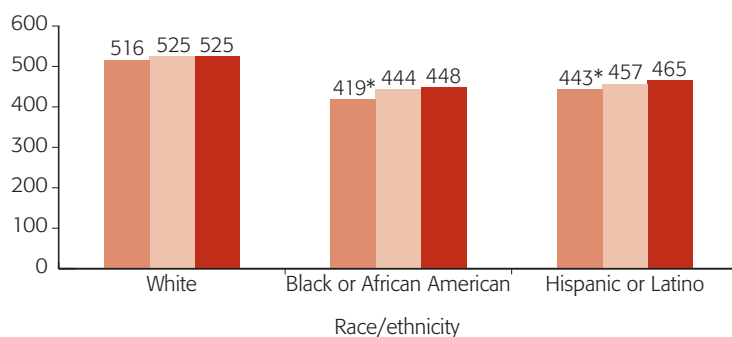
- U.S. eighth-grade boys and girls showed improvement in mathematics, on average, between 1995 and 2003.
- Both Black and Hispanic U.S. eighth-grade students improved average mathematics performance between 1995 and 2003.
- The gap in average mathematics scores between White and Black eighth-grade students narrowed over these 8 years.

Average mathematics scale scores of U.S. eighth-grade students, by sex, race/ethnicity, and poverty level: 1995, 1999 and 2003

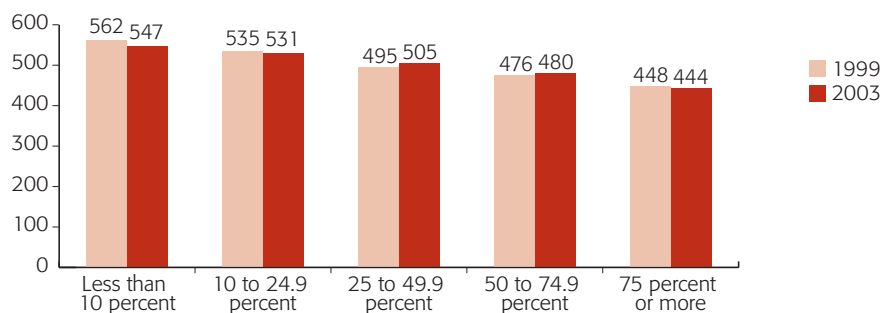
Average score



Average score



Average score



Percentage of eighth-grade students eligible in school for free or reduced-price lunch

* $p < .05$, denotes a significant difference from 2003 average score.

NOTE: Reporting standards not met for Asian category in 1995 or 1999. Reporting standards not met for American Indian/Alaska Native and Native Hawaiian/Other Pacific Islander in 1995, 1999, and 2003. Racial categories exclude Hispanic origin. Other races/ethnicities are included in U.S. totals shown throughout the report. Analyses by poverty level are limited to students in public schools only. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one student group may be significant while a large difference for another student group may not be significant. The United States met international guidelines for participation rates in 2003 only after replacement schools were included. See appendix A for more information.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Student performance in SCIENCE

Grades Four and Eight

Fourth Grade Science Performance

- In 2003, U.S. fourth-grade students scored 536 on average in science, exceeding the international average of 489.
- There was no measurable difference detected in the average science performance of U.S. fourth-graders between 1995 and 2003.
- Although there was no measurable difference in the average scores of U.S. fourth-graders between 1995 and 2003, their performance in science relative to their peers was lower.

**Average science scale scores
of fourth-grade students, by
country: 2003**

Country	Average score
International average	489
Singapore	565
Chinese Taipei	551
Japan	543
Hong Kong SAR ^{1,2}	542
England ²	540
United States²	536
Latvia	532
Hungary	530
Russian Federation	526
Netherlands ²	525
Australia ²	521
New Zealand	520
Belgium-Flemish	518
Italy	516
Lithuania	512
Scotland ²	502
Moldova, Republic of	496
Slovenia	490
Cyprus	480
Norway	466
Armenia	437
Iran, Islamic Republic of	414
Philippines	332
Tunisia	314
Morocco	304

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

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²Met international guidelines for participation rates in 2003 only after replacement schools were included.

NOTE: The test for significance between the United States and the international average was adjusted to account for the U.S. contribution to the international average. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the largest number of nine-year-olds. In the United States and most countries, this corresponds to grade 4. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2003.

**Differences in average science scale scores
of fourth-grade students, by country: 1995
and 2003**

Country	1995	2003	Difference ¹
Singapore	523	565	42 ▲
Japan	553	543	-10 ▼
Hong Kong SAR ^{2,3}	508	542	35 ▲
England ³	528	540	13 ▲
United States³	542	536	-6
(Hungary)	508	530	22 ▲
(Latvia-LSS) ⁴	486	530	43 ▲
(Netherlands) ³	530	525	-5
New Zealand ⁵	505	523	18 ▲
(Australia) ³	521	521	-1
Scotland ²	514	502	-12 ▼
(Slovenia)	464	490	26 ▲
Cyprus	450	480	30 ▲
Norway	504	466	-38 ▼
Iran, Islamic Republic of	380	414	34 ▲

▲p<.05, denotes a significant increase.

▼p<.05, denotes a significant decrease.

¹Difference calculated by subtracting 1995 from 2003 estimate using unrounded numbers.

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³Met international guidelines for participation rates only after replacement schools were included.

⁴Designated LSS because only Latvian-speaking schools were included in 1995. For this analysis, only Latvian-speaking schools are included in the 2003 average.

⁵In 1995, Maori-speaking students did not participate. Estimates in this table are computed for students taught in English only, which represents between 98-99 percent of the student population in both years.

NOTE: Countries are ordered based on the 2003 average scores.

Parentheses indicate countries that did not meet international sampling or other guidelines in 1995. All countries met international sampling and other guidelines in 2003, except as noted. See NCES (1997) for details regarding 1995 data. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one country may be significant while a large difference for another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the largest number of nine-year-olds. In the United States and most countries, this corresponds to grade 4. See table A1 in appendix A for details. Detail may not sum to totals because of rounding.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Average science scale scores of fourth-grade students, by country: 1995 and 2003

Country	1995	Country	2003
Japan	553	Singapore	565
United States	542	Japan	543
(Netherlands)	530	Hong Kong SAR ^{1,2}	542
England	528	England ¹	540
Singapore	523	United States¹	536
(Australia)	521	Hungary	530
Scotland	514	Latvia-LSS ³	530
Hong Kong SAR ²	508	Netherlands ¹	525
(Hungary)	508	New Zealand ⁴	523
New Zealand ⁴	505	Australia ¹	521
Norway	504	Scotland ¹	502
(Latvia-LSS) ³	486	Slovenia	490
(Slovenia)	464	Cyprus	480
Cyprus	450	Norway	466
Iran, Islamic Republic of	380	Iran, Islamic Republic of	414

- Average is higher than the U.S. average
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Eighth-Grade Science Performance

- In 2003, U.S. eighth-graders scored 527 on average in science, exceeding the international average of 473.
- U.S. eighth-graders showed significant improvement in average science performance between 1995 and 2003.
- The relative performance of U.S. eighth-grade students in science was higher in 2003 than in 1995.

**Average science scale scores
of eighth-grade students, by
country: 2003**

Country	Average score
International average ¹	473
Singapore	578
Chinese Taipei	571
Korea, Republic of	558
Hong Kong SAR ^{2,3}	556
Estonia	552
Japan	552
Hungary	543
Netherlands ²	536
(United States)	527
Australia	527
Sweden	524
Slovenia	520
New Zealand	520
Lithuania ⁴	519
Slovak Republic	517
Belgium-Flemish	516
Russian Federation	514
Latvia	512
Scotland ²	512
Malaysia	510
Norway	494
Italy	491
(Israel)	488
Bulgaria	479
Jordan	475
Moldova, Republic of	472
Romania	470
Serbia	468
Armenia	461
Iran, Islamic Republic of	453
(Macedonia, Republic of)	449
Cyprus	441
Bahrain	438
Palestinian National Authority	435
Egypt	421
Indonesia ⁴	420
Chile	413
Tunisia	404
Saudi Arabia	398
(Morocco)	396
Lebanon	393
Philippines	377
Botswana	365
Ghana	255
South Africa	244

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

¹The international average reported here differs from that reported in Martin et al. (2004) due to the deletion of England average. In Martin et al. the reported international average is 474.

²Met international guidelines for participation rates in 2003 only after replacement schools were included.

³Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

⁴National desired population does not cover all of the international desired population.

NOTE: Countries are ordered by 2003 average score. The test for significance between the United States and the international average was adjusted to account for the U.S. contribution to the international average. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Parentheses indicate countries that did not meet international sampling or other guidelines in 2003. Countries were required to sample students in the upper of the two grades that contained the largest number of 13-year-olds. In the United States and most countries, this corresponds to grade 8. See table A1 in appendix A for details.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2003.

Differences in average science scale scores of eighth-grade students, by country: 1995, 1999, and 2003

Country	1995	1999	2003	Difference ¹	
				(2003-1995)	(2003-1999)
Singapore	580	568	578	-3	10
Chinese Taipei	—	569	571	†	2
Korea, Republic of	546	549	558	13 ▲	10 ▲
Hong Kong SAR ^{2,3}	510	530	556	46 ▲	27 ▲
Japan	554	550	552	-2	3
Hungary	537	552	543	6	-10 ▼
(Netherlands) ²	541	545	536	-6	-9
(United States)	513	515	527	15 ▲	12 ▲
(Australia) ⁴	514	—	527	13 ▲	†
Sweden	553	—	524	-28 ▼	†
(Slovenia) ⁴	514	—	520	7 ▲	†
New Zealand	511	510	520	9	10
(Lithuania) ⁵	464	488	519	56 ▲	31 ▲
Slovak Republic	532	535	517	-15 ▼	-18 ▼
Belgium-Flemish	533	535	516	-17 ▼	-19 ▼
Russian Federation	523	529	514	-9	-16 ▼
(Latvia-LSS) ⁶	476	503	513	37 ▲	11
(Scotland) ²	501	—	512	10	†
Malaysia	—	492	510	†	18 ▲
Norway	514	—	494	-21 ▼	†
Italy ⁷	—	493	491	†	-2
(Israel) ⁷	—	468	488	†	20 ▲
(Bulgaria)	545	518	479	-66 ▼	-39 ▼
Jordan	—	450	475	†	25 ▲
Moldova, Republic of	—	459	472	†	13 ▲
(Romania)	471	472	470	-1	-2
Iran, Islamic Republic of	463	448	453	-9 ▼	5
(Macedonia, Republic of)	—	458	449	†	-9
Cyprus	452	460	441	-11 ▼	-19 ▼
Indonesia ⁵	—	435	420	†	-15 ▼
Chile	—	420	413	†	-8
Tunisia	—	430	404	†	-26 ▼
Philippines	—	345	377	†	32 ▲
South Africa ⁸	—	243	244	†	1

—Not available.

†Not applicable.

▲p<.05, denotes a significant increase.

▼p<.05, denotes a significant decrease.

¹Difference calculated by subtracting 1995 or 1999 from 2003 estimate using unrounded numbers.

²Met international guidelines for participation rates in 2003 only after replacement schools were included.

³Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

⁴Because of national-level changes in the starting age/date for school, 1999 data for Australia and Slovenia cannot be compared to 2003.

⁵National desired population does not cover all of the international desired population in all years for Lithuania, and in 2003 for Indonesia.

⁶Designated LSS because only Latvian-speaking schools were included in 1995 and 1999. For this analysis, only Latvian-speaking schools are included in the 2003 average.

⁷Because of changes in the population tested, 1995 data for Israel and Italy are not shown.

⁸Because within classroom sampling was not accounted for, 1995 data are not shown for South Africa.

NOTE: Countries are sorted by 2003 average scores. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one country may be significant while a large difference for another country may not be significant. Parentheses indicate countries that did not meet international sampling and/or other guidelines in 1995, 1999, and/or 2003. See appendix A for details regarding 2003 data. See Gonzales et al. (2000) for details regarding 1995 and 1999 data. Countries were required to sample students in the upper of the two grades that contained the largest number of 13-year-olds. In the United States and most countries, this corresponds to grade 8. See table A1 in appendix A for details. Detail may not sum to totals because of rounding.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995, 1999, and 2003.

Average science scales scores of eighth-grade students, by country: 1995 and 2003

Country	1995	Country	2003
Singapore	580	Singapore	578
Japan	554	Korea, Republic of	558
Sweden	553	Hong Kong SAR ^{1,2}	556
Korea, Republic of	546	Japan	552
(Bulgaria)	545	Hungary	543
(Netherlands)	541	Netherlands ²	536
Hungary	537	(United States)	527
Belgium-Flemish	533	Australia	527
Slovak Republic	532	Sweden	524
Russian Federation	523	Slovenia	520
Norway	514	New Zealand	520
(Australia)	514	Lithuania ³	519
(Slovenia)	514	Slovak Republic	517
United States	513	Belgium-Flemish	516
New Zealand	511	Russian Federation	514
Hong Kong SAR ¹	510	Latvia-LSS ⁴	513
(Scotland)	501	Scotland ²	512
(Latvia-LSS) ⁴	476	Norway	494
(Romania)	471	Bulgaria	479
Lithuania ³	464	Romania	470
Iran, Islamic Republic of	463	Iran, Islamic Republic of	453
Cyprus	452	Cyprus	441

- Average is higher than the U.S. average
- Average is not measurably different from the U.S. average
- Average is lower than the U.S. average

¹Hong Kong is a Special Administrative Region (SAR) of the People's Republic of China.

²Met international guidelines for participation rates in 2003 only after replacement schools were included.

³National desired population does not cover all of the international desired population.

⁴Designated LSS because only Latvian-speaking schools were included in 1995. For this analysis, only Latvian-speaking schools are included in the 2003 average.

NOTE: Countries are ordered by average score. Parentheses indicate countries that did not meet international sampling or other guidelines in 1995 or 2003. See appendix A for details regarding 2003 data. See NCES (1997) for details regarding 1995 data. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between the United States and one country may be significant while a large difference between the United States and another country may not be significant. Countries were required to sample students in the upper of the two grades that contained the largest number of 13-year-olds. In the United States and most countries, this corresponds to grade 8. See table A1 in appendix A for details.

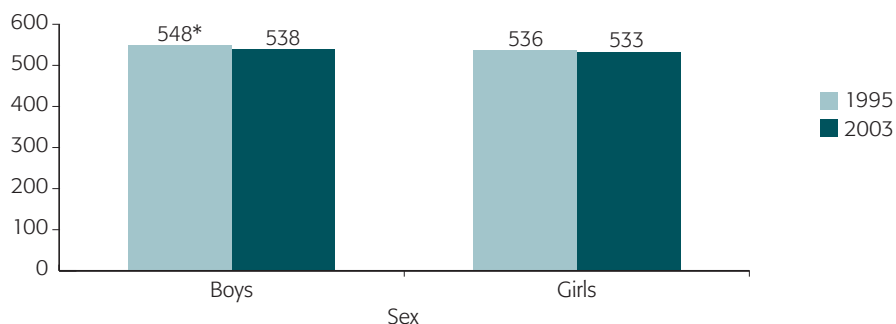
SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Fourth-Grade Subpopulation Science Performance

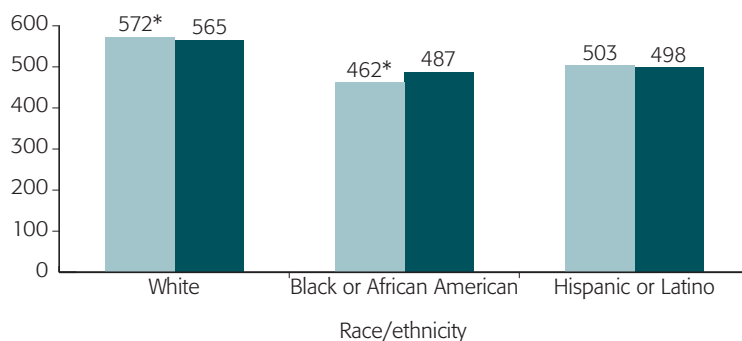
- Black U.S. fourth-grade students improved their average science performance between 1995 and 2003.
- U.S. fourth-grade boys and White students turned in lower average science performances in 2003 than in 1995.
- The gap in science achievement between U.S. fourth-grade boys and girls, and White and Black students narrowed between 1995 and 2003.

Average science scale scores of U.S. fourth-grade students, by sex, race/ethnicity, and poverty level: 1995 and 2003

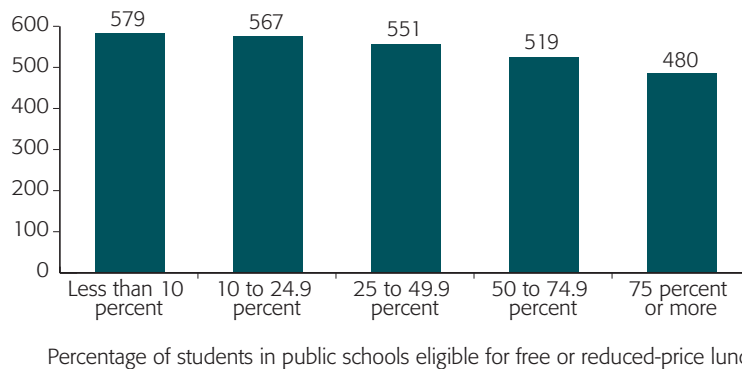
Average score



Average score



Average score



*p<.05, denotes a significant difference from 2003 average score.

NOTE: Reporting standards not met for Asian category in 1995 and American Indian or Alaska Native and Native Hawaiian or Other Pacific Islander for both years. Racial categories exclude Hispanic origin. Other races/ethnicities are included in U.S. totals shown throughout the report. Analyses by poverty level are limited to students in public schools only. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one student group may be significant while a large difference for another student group may not be significant. The United States met international guidelines for participation rates in 2003 only after replacement schools were included. See appendix A for more information.

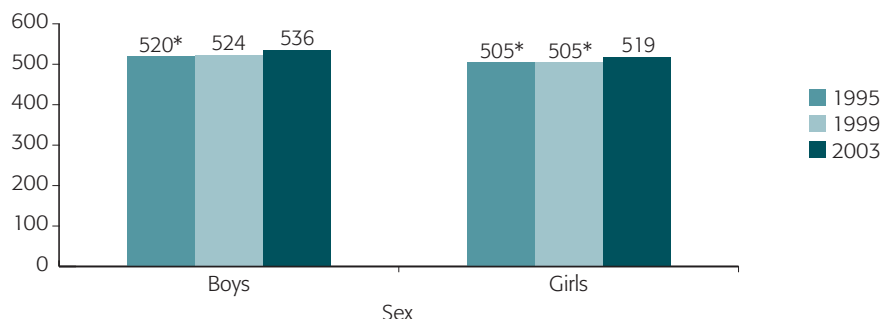
SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

Eighth-Grade Subpopulation Science Performance

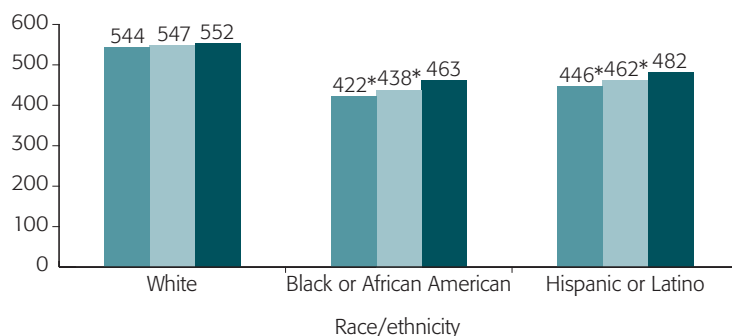
- In 2003, U.S. eighth-grade boys and girls improved their average science performance compared to 1995.
- As observed for mathematics, both Black and Hispanic U.S. eighth-grade students improved average science performance between 1995 and 2003.
- The achievement gap in science between White and Black, and White and Hispanic eighth-graders narrowed between 1995 and 2003.

Average science scale scores of U.S. eighth-grade students, by sex, race/ethnicity, and poverty level: 1995, 1999 and 2003

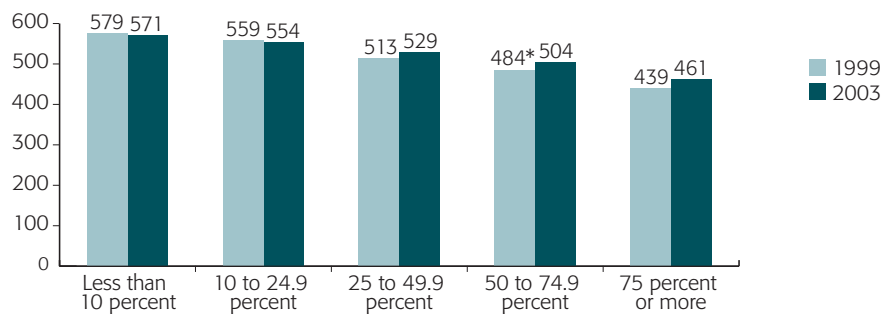
Average score



Average score



Average score



Percentage of eighth-grade students eligible in school for free or reduced-price lunch

* $p < .05$, denotes a significant difference from 2003 average score.

NOTE: Reporting standards not met for Asian category in 1995 or 1999. Reporting standards not met for American Indian/Alaska Native and Native Hawaiian/Other Pacific Islander in 1995, 1999, and 2003. Racial categories exclude Hispanic origin. Other races/ethnicities are included in U.S. totals shown throughout the report. Analyses by poverty level are limited to students in public schools only. The tests for significance take into account the standard error for the reported difference. Thus, a small difference between averages for one student group may be significant while a large difference for another student group may not be significant. The United States met international guidelines for participation rates in 2003 only after replacement schools were included. See appendix A for more information.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 1995 and 2003.

**For more information, visit
the NCES web site at**

<http://nces.ed.gov/timss>